assigned U.S. Patent applications and issued patents. U.S. Patent No. 5,655,530 and U.S. Patent No. 5,823,951, filed April 18, 1997, entitled "Method for Non-invasive Blood Analyte Measurement with Improved Optical Interface" relate to near-infrared analysis of a tissue analyte concentration that varies with time, with a primary focus on glucose concentrations in diabetic individuals. The methods and apparatus include placing a refractive index-matching medium between a sensor and the skin to improve the accuracy and repeatability of testing. U.S. Patent Application Serial No. 09/174,812, filed October 19, 1998, entitled "Method for Non-Invasive Blood Analyte Measurement with Improved Optical Interface," now U.S. Patent No. 6,152,876, discloses additional improvements in non-invasive living tissue analyte analysis. The disclosure of each of these three applications or patents are hereby incorporated by reference. --

A1 con't

Please replace the paragraph spanning lines 6-20 of page 6 of the application with the following:

-- U.S. Patent No. 5,636,633 relates, in part, to another aspect of accurate non-invasive measurement of an analyte concentration. The apparatus includes a device having transparent and reflective quadrants for separating diffuse reflected light from specular reflected light. Incident light projected into the skin results in specular and diffuse reflected light coming back from the skin. Specular reflected light has little or no useful information and is preferably removed prior to collection. U.S. Patent No. 5,935,062, filed June 9, 1997, entitled "Improved Diffuse Reflectance Monitoring Apparatus", discloses a further improvement for accurate analyte concentration analysis which includes a blocking blade device for separating diffuse reflected light from specular reflected light. The blade allows light from the deeper, inner dermis layer to be captured, rejecting light from the surface, epidermis layer, where the epidermis layer has much less analyte information than the inner dermis layer, and contributes noise. The blade traps specular reflections as well as diffuse reflections from the epidermis. The disclosures of the above patent and application, which are assigned to the assignee of the present application, are also incorporated herein by reference. --

A2

Please replace the paragraph spanning lines 6 on page 7 to line 10 of page 8 of the application with the following:

-- The present invention includes methods and apparatus for biometric identification or verification of individuals using optical spectroscopy in the near ultraviolet, visible or near-infrared spectral regions and combinations of those spectral regions. The methods and apparatus disclosed provide superior performance relative to current biometric systems as well as provide other advantages. Prior art biometric identification devices have the distinct disadvantage of requiring the use of specific body parts in order to achieve their techniques. For example, fingerprint devices require that only the extreme ventral portion of the fingers can be used as the biometric site. The methods and apparatus of the present invention enable biometric identification to occur with finger, palms, wrists, forearms and other convenient sites on the body. Further, even in the case of using fingers, the present invention allows use of multiple sites along the finger on both the dorsal or ventral surfaces. Present finger print readers require that the same finger be presented to the reader for identification or verification that was presented during the enrollment analysis. The present invention can use different fingers (or other sites) for enrollment and for subsequent verification. This capability provides for increased enrollment efficiency since the user only has to present one enrollment site to the system, but also provides critical flexibility during the use of the device. An example of this flexibility is the case where the user has enrolled a site on a particular hand and that particular site is unavailable for subsequent analysis due to some injury or some severe surface contamination of the site. This spectroscopic-based biometric system of the present invention can operate on the site from the other hand without previous enrollment of such site. Further, although the results below are based on optical systems that require contact with the skin surface, the optical system such as that disclosed in U.S. Patent No. 5,636,633 or U.S. Patent No. 5,935,062 discussed previously could be used in the present invention to generate similar data in a non-contact mode. Such a non-contact biometric sensor apparatus would have significant advantages when installed in public locations to

A3 con't

minimize wear and contamination issues associated with critical optical elements.--

Please replace the paragraph spanning lines 8-9 at line 8, page 14 of the application with the following:

A4

-- Fig. 7 is a graph depicting receiver operating conditions for the biometric sensor of Fig. 6;--

Please insert the following paragraphs at page 14, line 10 of the application.

A5

--Fig. 8 is a block diagram depicting a preferred spectroscopic system method;

Fig. 9 is a block diagram showing an alternate method of a spectroscopic system;

Fig. 10 is a block diagram describing a spectroscopic system process;

Fig. 11 is a block diagram showing an alternate process for a spectroscopic system; and

Fig. 12 depicts the components of a process using a preferred spectroscopic system.--

Please replace the paragraph spanning line 19, page 15 to line10, page 16 of the application with the following:

A6

-- As previously stated and shown in Figure 12, there are two components believed of importance to the success of the method of the present invention. First, the method incorporates an apparatus and technique for accurately and repeatably acquiring a tissue spectrum 1200 that minimizes effects due to instrumental, environmental and sampling changes, while remaining sensitive to slight changes in the spectral properties of tissue at any given wave length. As well, the system optimizes optical throughput both into and out of the tissue

sample. Second, the method requires specific techniques, such as an algorithm 1210, for training the instrument to identify spectral features of significance for that particular individual, and then to compare such features to new spectral data acquired at the time of attempted verification or identification. Because the spectral features or combinations of spectral features that are unique for a particular individual are not readily apparent or identified by visual comparison of a spectral result and the unique spectral features are present at different wavelengths for different individuals, the present invention relies on discriminant analysis techniques to compare spectral data. Each component of the apparatus and method of the present invention are detailed below.--

A6 con't

Please replace the paragraph spanning lines 15-23 of page 20 of the application with the following:

-- The input element 20 of the sensor element 11 can include optical fibers or an optical lens which focuses the light energy to a high energy density spot. However, it is understood that other beam focusing means may be utilized in conjunction with the optical lens to alter the area of illumination. For example, a multiple lens system, tapered fibers, or other conventional optical beam-shaping devices could be utilized to alter the input light energy. In other preferred embodiments, the sampler 36 can be of a non-fiber design consisting of a compound parabolic concentrated (CPC) to concentrate the light at the sample site, as disclosed in the above cited U.S. Patent Application entitled "Encoded Variable Filter Spectrometer."--

A7

Please replace the paragraph spanning lines 4-16 of page 21 of the application with the following:

-- In both embodiments depicted in Figs. 2 and 3, an output sensor 26 is utilized to receive reflected or transmitted light energy from the tissue 10. In a preferred embodiment, a specular control device is incorporated to separate the specular reflected light from diffusely reflected light. Such devices are disclosed

A8

in co-pending and commonly assigned U.S. Patent No. 5,935,062, filed June 9, 1997, and entitled "Diffuse Reflectance Monitoring Apparatus", the disclosure of which is incorporated herein by reference. As described in conjunction with a method of analysis below, the embodiment of Fig. 2 has an output sensor 26 which receives reflected light energy, while the embodiment of Fig. 3 includes an output sensor 26 which receives transmitted light through the tissue 10. As with the input element 20, the output element 26 is preferably an optical lens. Other optical collection means may be incorporated into an output element 26, such as a multiple lens system, tapered fiber, or other beam-collection means to assist in directing the light energy to the spectrum analyzer 30. --

A8 con't

Please replace the paragraph spanning lines 8-22 of page 23 of the application with the following:

-- In Figure 1, the spectrometer subsystem 40 can include a variety of methods and apparatus. A preferred method of detecting optical spectra is achieved based upon optical interference phenomena such as in a Fourier transform infrared spectrometer system. One such system is disclosed in commonly assigned U.S. Patent Application Serial No. 09/832,585, entitled "System for Non-Invasive Measurement of Glucose in Humans," filed on even date herewith, and U.S. Patent Application Serial No. 09/832,631, entitled "Encoded Variable Filter Spectrometer," filed on even date herewith, the disclosures of which are both incorporated herein by reference. Other ways to detect optical spectra include using gratings, prisms, tunable filters, mock interferometers, Sagnac or common-path interferometers, and other means known to those of skill in the art. Many of these spectrometers also enable the spectrometer and detector to be treated as two distinct units with the spectral-separation occurring prior to the tissue. For example, an FTIR tunable filter, and a mock interferometer could all be placed prior to the tissue and impress an encoding on the light, which will subsequently be seen by the detector placed after the tissue as shown in Figure 1. --

A9

Please replace the paragraphs spanning line 14, page 24 to line 15, page 25 of the application with the following:

--In a preferred method as depicted in Figures 8 and 9, the identification or verification task is implemented when a person seeks to perform an operation for which there are a limited number of people authorized (e.g., perform a spectroscopic measurement, gain entry into a room, achieve control over an interlocked vehicle or piece of machinery, pass through an immigration checkpoint, etc.). The person's spectral data is used for identification or verification of the person's identity. In this preferred method, the person initially enrolls in the system by collecting one or more representative tissue spectra in a database 800, 910 of a computer 900. If two or more spectra are collected during the enrollment, then these spectra be checked for consistency and recorded only if they are sufficiently similar, limiting the possibility of a sample artifact corrupting the enrollment data. For a verification implementation, an identifier 930 such as a PIN code, magnetic card number, username, badge, voice pattern, other biometric, or some other identifier would also be collected and associated with the confirmed enrollment spectrum or spectra.

A10

In subsequent use, biometric identification would take place by collecting a spectrum 810, 920 from a person attempting to gain authorization. This spectrum would then be compared to the spectra in the enrolled authorization database 800, 910 and an identification made 830 if the match to an authorized database entry was better than a predetermined threshold. The verification task is similar, but would require that the person present the identifier in addition to a collected spectrum. The identifier would then be used to select a particular enrollment database spectrum and authorization would be granted if the current spectrum were sufficiently similar to the selected enrollment spectrum. If the biometric task is associated with an operation for which only a single person is authorized, then the verification task and identification task are the same and both simplify to an assurance that the sole authorized individual is attempting the operation without the need for a separate identifier.--